

1-3 Dilation and Translation of Function Graphs

Each of these two graphs shows the unit semicircle and a **transformation** of it. The left graph shows the semicircle *dilated* (magnified) by a factor of 5 in the x -direction and by a factor of 3 in the y -direction. The right graph shows the unit semicircle *translated* by 4 units in the x -direction and by 2 units in the y -direction.

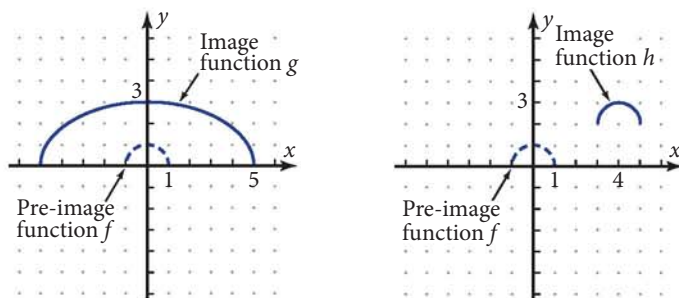


Figure 1-3a

The transformed functions, g and h , in Figure 1-3a are called *images* of the function f . The original function, f , is called the *pre-image*. In this section you will learn how to transform the equation of a function so that its graph will be dilated and translated by given amounts in the x - and y -directions.

Objective

Transform a given pre-image function so that the result is a graph of the image function that has been dilated by given factors and translated by given amounts.

Dilations

To get the vertical dilation in the left graph of Figure 1-3a, multiply each y -coordinate by 3. Figure 1-3b shows the image, $y = 3f(x)$.

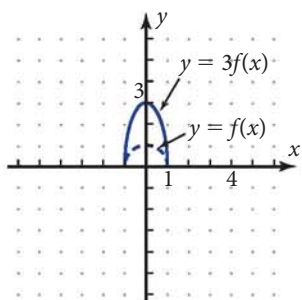


Figure 1-3b